

**HRS / Palm Beach County Public Health Unit**  
**DIVISION OF ENVIRONMENTAL SCIENCE AND ENGINEERING**

# **AIR POLLUTION** **CONTROL PROGRAM**



## **1993 Annual Report**



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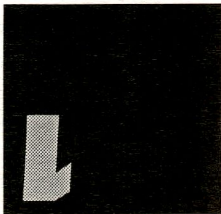
# Message from the Director of the Health Unit

The environment that surrounds us, the air that we breathe, is of vital public health concern. Any strategy for reducing air pollution and improving air quality depends upon public awareness and interest. It is the intent of the Palm Beach County Public Health Unit to raise awareness through this annual air program report.

The major air pollutants, carbon monoxide, lead, nitrogen oxides, ozone, particulate matter and sulfur dioxide, can have an adverse impact on our health. The identification and monitoring of the sources of air pollution as well as ongoing assessment of total air quality are the foundation for our pollution control activities.

By informing the public of Palm Beach County's ambient air quality and those programs that presently address air pollution prevention, the community can gain knowledge on this important issue and thereby support the new challenges that we face in protecting our air quality.

Jean M. Malecki, M.D., M.P.H.  
Director of Palm Beach County Public Health Unit





## *Message from the Director of Environmental Science & Engineering*



I am pleased to present the Palm Beach County Public Health Unit's 1993 Air Pollution Control Annual Report. This year was very significant for a number of reasons. Air monitoring data for the Southeast Florida Airshed (Dade, Broward, and Palm Beach Counties) indicates continued compliance with the air quality standard for ozone. The Health Unit completed a comprehensive inventory of the sources and emissions of the pollutants that contribute to the formation of ozone, and made a projection of future emissions. All indications are that future emissions will be lower than present levels. This information was used to support a request submitted to the U.S. Environmental Protection Agency (EPA) by the Florida Department of Environmental Protection (DEP) to have the Southeast Florida Airshed redesignated from an ozone nonattainment area to a maintenance area. If EPA accepts the redesignation request, no additional ozone control measures will be required for our area beyond those presently adopted.

It is with guarded optimism that we welcome this redesignation. The reason is an air monitoring station located in the south county area recorded an exceedance of the ozone standard in August, of 1993. This was the first time in over ten years the standard was exceeded in the county. Fortunately, this was not a violation of the ozone standard because federal regulations allow an average of one exceedance per year at a monitoring station during a three year period. It is our hope that this one exceedance was an anomaly. We believe that given existing control measures along with new control strategies being implemented—such as the systems installed to capture gasoline vapors during the refueling of motor vehicles—the air quality can be maintained.

One of the major accomplishments of the year was the completion of a Specific Operating Agreement (SOA) with DEP. This SOA includes a new responsibility for the Health Unit to issue or deny state permits to designated categories of air pollution sources. With this delegation, we believe we can provide better services to the regulated community and eliminate some duplication of effort. In the near future we anticipate the delegation of more new programs, and will be enforcing new regulations which are products of further implementation of the 1990 Clean Air Act Amendments.

One of the new upcoming programs that we will be emphasizing is pollution prevention. The focus of this strategy is to reduce the amount of pollution produced through such means as energy conservation, product substitutions and waste minimization. The pollution prevention program is a cooperative effort and relies more on voluntary measures than regulations.

Our air program will continue to develop to meet the challenges of the future. However, with all of these changes, we shall not lose sight of our primary objective that is to protect public health.

*Frank J. Gargiulo, P.E.*



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## I. INTRODUCTION

*Air is an essential natural resource, one that we cannot afford to take for granted. Many everyday activities contribute to pollution of this vital resource. Clean air is important. A decline in overall air quality can damage health and property, effect business, recreation, and tourism. Since each of us contributes in some manner to air pollution, we must all take responsibility for seeking a solution.*

*To address this problem, the HRS/Palm Beach County Public Health Unit (PBCPHU) has implemented an extensive air pollution control program. Working closely with other agencies and organizations, the Health Unit is striving to protect and maintain the good air quality Palm Beach County residents now enjoy.*



## Characteristics of Palm Beach County

Palm Beach County is located along the southeast coast of Florida, and is part of what is generally called the "Florida Gold Coast." Containing about 2,000 square miles, Palm Beach County is geographically separated into two regions. One region is a highly urbanized coastal strip, stretching approximately forty-five miles north to south, from Tequesta to Boca Raton. The other region is agricultural, located in the western portion of Palm Beach County (the Glades Area).

The estimated population of Palm Beach County in 1993 was 918,223. About 90% of the population is located along the coast, reaching inland about 15 miles. Rapid development in recent years has resulted in the growth of several municipalities within this coastal strip. The major cities with populations over or approaching 50,000 are West Palm Beach, Boca Raton, Delray Beach, and Boynton Beach.

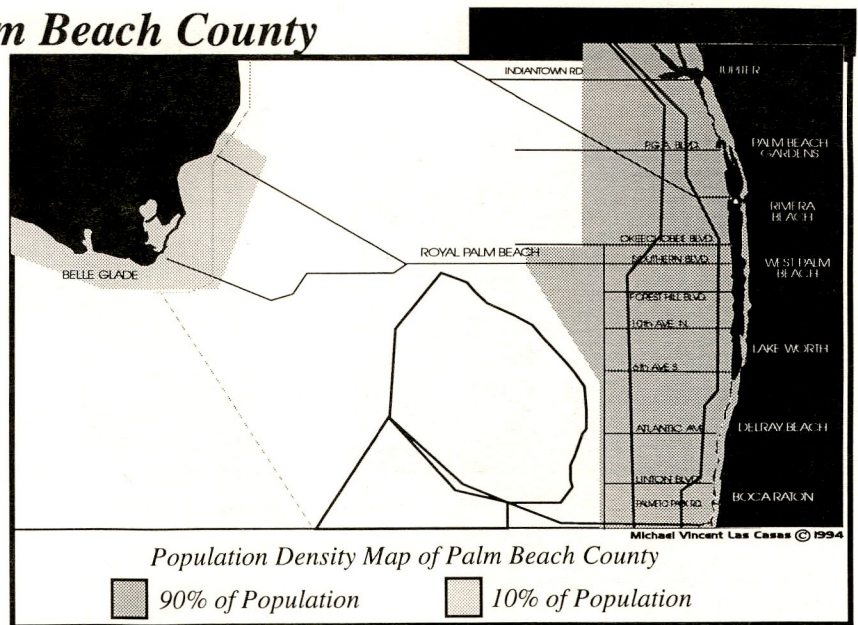
The area around Lake Okeechobee contains almost all of the remaining 10% of the county's population. Municipalities in the Glades Area include Belle Glade, Pahokee, and South Bay. The economy of this area is agricultural, based on sugar cane and winter vegetables.

Tourism and related businesses continue to be the dominant economic factors in the urban area. Tourism has kept pace with an increasing population. Other major industries in the area include building construction and related fields, agriculture, aircraft testing, computer and electronics manufacturing, concrete, asphalt, and service industries.

The complexity of the problems of air pollution control are related to the widespread growth in Palm Beach County. Advances in environmental protection activities, which are being carried out by this program, have been utilized in order to keep abreast of air pollution problems. These activities are characteristic of urban areas across the nation.

## Organization and Goals

The air pollution control program is organized under the Palm Beach County Public Health Unit's Division of Environmental Science and Engineering. Established in 1965, it is one of the oldest and most experienced programs in the state. Operating on behalf of Palm Beach County, the Health Unit's program is recognized by the Florida Department of Environmental Protection as an approved local air



Jim Stormer, Air Program Administrator

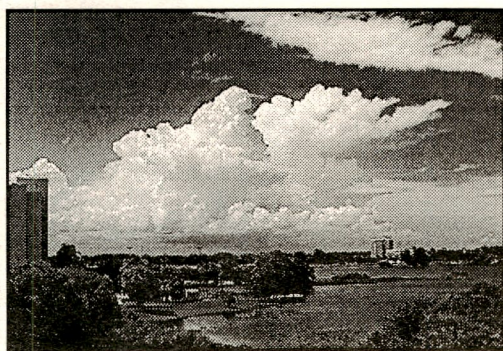


program. The program is supported by general revenue funds, license fees, a federal grant, and motor vehicle registration fees.

The goals and objectives of the Health Unit's air program are to:

- attain and maintain National Ambient Air Quality Standards.
- protect public health, safety and welfare.
- promote air quality preservation and the conservation of our natural resources.

To accomplish these goals, the air pollution control program is organized in two general areas: air pollution control and air quality assessment. Given sufficient resources, adequate regulations, and most importantly, the support of the public, these goals and objectives can be achieved.



*Clean air is a prerequisite to maintaining the natural beauty and quality of life offered by Palm Beach County.*

## II. MAJOR AIR POLLUTANTS & HEALTH EFFECTS

A number of air pollutants can cause damage to our health. The Clean Air Act provides for the establishment of National Ambient Air Quality Standards (NAAQS) for a select list of air pollutants. These "criteria" air pollutants are the most prevalent and have the greatest overall adverse impacts on health. The standards are designed to protect public health with a margin of safety, and are based on the best available scientific evidence. Table 2.1 lists the current NAAQS for the six criteria air pollutants and a description of each pollutant follows.

AMBIENT AIR QUALITY STANDARDS				
POLLUTANT	UNITS	FEDERAL PRIMARY	FEDERAL SECONDARY	STATE
<b>Inhalable Particulate Matter</b>				
Annual Arithmetic Mean	$\mu\text{g}/\text{m}^3$	50	—	Same
Maximum 24 Hour Value	$\mu\text{g}/\text{m}^3$	150	—	Same
<b>Sulfur Dioxide</b>				
Annual Arithmetic Mean	$\mu\text{g}/\text{m}^3$	80	—	60
	PPM	0.03	—	0.02
Maximum 24 Hour Value	$\mu\text{g}/\text{m}^3$	365	—	260
	PPM	0.14	—	0.10
Maximum 3 Hour Value	$\mu\text{g}/\text{m}^3$	—	1300	Same
	PPM	—	0.50	Same
<b>Carbon Monoxide</b>				
Maximum 8 Hour Value	$\text{mg}/\text{m}^3$	10	Same	Same
	PPM	9	Same	Same
Maximum 1 Hour Value	$\text{mg}/\text{m}^3$	40	—	Same
	PPM	35	—	Same
<b>Ozone</b>				
Maximum 1 Hour Value	$\text{mg}/\text{m}^3$	235	Same	Same
	PPM	0.12	Same	Same
<b>Nitrogen Dioxide</b>				
Annual Arithmetic Mean	$\mu\text{g}/\text{m}^3$	100	Same	Same
	PPM	0.05	Same	Same
<b>Lead</b>				
3 Month Average	$\mu\text{g}/\text{m}^3$	1.5	Same	Same

TABLE 2.1 Federal and State Ambient Air Quality Standards



## ***Carbon Monoxide***

Carbon monoxide (CO) is a colorless, odorless and tasteless gas. It is formed during incomplete combustion when carbon containing fuel is partially oxidized to carbon monoxide rather than carbon dioxide (CO<sub>2</sub>). The major source of carbon monoxide (90%) is from motor vehicle emissions, mostly from poorly operating automobiles.

Carbon monoxide is toxic because it combines with hemoglobin in the blood which interferes with the transfer of oxygen to cell tissues. Carbon monoxide has 210 times the affinity for hemoglobin than oxygen, and it remains more tightly bound. Because it competes with oxygen, it can seriously interfere with the transport of oxygen throughout the body. The amount of carbon monoxide that combines with hemoglobin is dependent upon the concentration of carbon monoxide in the air and the length of exposure. Concentrations in excess of 750 parts per million can cause death by asphyxiation.

Exposure to ambient levels exceeding the standards can affect the central nervous system as a result of reduced oxygen levels in the brain. Effects include impairment in the ability to estimate time intervals, to discriminate brightness and to react to visual stimuli.

Individuals suffering from anemia or a cardiovascular disease, such as emphysema, are more likely to be affected by carbon monoxide. Cigarette smokers, and those exposed to environmental (second hand) tobacco smoke, are also more susceptible to the effects of carbon monoxide. This is a result of the environmental exposure adding to the already elevated residual CO levels in the blood due to cigarette smoking.

## ***Lead***

Until recently, the major source of lead in the atmosphere was from automobiles using gasoline containing lead. However, the use of lead compounds (as gasoline additives) is being phased out, with a nationwide ban to take effect in 1994. Another contributing source of lead emissions in Palm Beach County is a municipal waste combustor.

Airborne lead can enter the body through inhalation, ingestion of foods or drinking water contaminated with lead particle deposits. Upon entering the body, lead can be absorbed in the blood stream and distributed throughout the body where its toxic effects can cause damage. The most sensitive organs and systems are the blood, the brain and nervous system, the kidneys, and the reproductive system.

Young children are particularly at risk because the adverse health effects occur at lower lead levels than for adults. Moreover, children are more likely to be exposed through the ingestion of soil and dust containing lead as a result of playing in heavily urbanized or industrialized settings. Studies have documented that learning disabilities and lower IQs can occur in children having elevated lead levels in the blood.



*Automobiles are a major source of carbon monoxide.*





## Nitrogen Oxides (NO<sub>x</sub>)

The atmosphere is made up of about 78% nitrogen and 21% oxygen. During combustion under high temperatures (e.g., automobile engines and electric utility plants) these two elements combine to form nitrogen oxides. From an air pollution standpoint, the two compounds of major concern are nitric oxide and nitrogen dioxide.

Nitric oxide (NO) is a colorless and odorless gas. It is relatively non-irritating, and at ambient level does not pose a health threat. However, NO can be oxidized in the atmosphere through photochemical reactions to form nitrogen dioxide which is a health concern.

Nitrogen dioxide (NO<sub>2</sub>) is a reddish-brown gas that is considered toxic. At elevated levels above ambient conditions, it can cause damage to the respiratory system and aggravate respiratory infections.

Nitrogen oxides can also contribute to acid rain. However, the primary concern with nitrogen oxides is that they contribute to ozone formation. This leads to further increases in smog.

## Ozone

Ozone is a highly reactive compound made up of three oxygen atoms (O<sub>3</sub>). It is characterized by a pungent odor and faint bluish tint. It is a strong oxidant, and is one of the more toxic regulated air pollutants. Ozone also causes damage to vegetation, crops, and materials (especially those containing plastics and rubber). As the principal component of smog, it also reduces visibility.

Ozone is not directly released into the atmosphere, but is formed from the photochemical reactions of volatile organic compounds (VOC) and nitrogen oxides (NO<sub>x</sub>) in the presence of sunlight. It is the principle pollutant in smog. Because ozone formation is dependent upon sunlight, the highest concentrations typically occur in the early afternoon, from May through September. Currently, Palm Beach County is designated as being nonattainment with the NAAQS for the pollutant ozone.

***“Ground level ozone is the primary pollutant responsible for smog.”***

Ground level ozone which is harmful should not be confused with the beneficial ozone in the earth's ozone layer. The ozone layer is in a level of the upper atmosphere called the stratosphere, located from 9 to 25 miles above the earth. It filters out harmful ultraviolet radiation from the sun (known to cause skin cancer), thereby shielding the earth's surface. Very little mixing occurs between the lower atmosphere and the stratosphere.

Ground level ozone has been shown to cause a number of physiological and pathological changes in both humans and animals. At concentrations exceeding the standard, it causes decreases in lung capacity. Individuals participating in strenuous labor or rigorous physical exercise are particularly at risk. Symptoms include shortness of breath, chest pains or tightness, throat dryness, headache, and nausea. Also, asthmatics and those with pre-existing respiratory ailments may be more susceptible to attacks by ozone exposure.

There is also evidence that prolonged exposure to ozone will tend to retard lung clearance, and interfere with or inhibit the body's immune system. Research on the effects of chronic ozone exposure is ongoing.



## Particulate Matter

Particulate matter is liquid or solid particles suspended in the atmosphere. Many natural sources contribute to suspended particulate matter such as soil, sand, mold spores, and pollens. Sources of man-made particulate matter emissions include stationary fuel combustion, motor vehicle emissions, open burning, construction activities, and roadway traffic.

Particles that have an aerodynamic diameter of less than 10 micrometers ( $PM_{10}$ ) are classified as "inhalable." This means that they can enter and be deposited in the lower respiratory system. In general, the smaller the particle, the more likely it can be deposited in the lower regions of the respiratory system. Deposition is also dependent on other physical and chemical characteristics of the particle.

Once a particle is deposited, the body's defense mechanism will attempt to clear it. Usually the deeper a particle is deposited in the respiratory system, the longer it will take to be cleared, and therefore, the longer the exposure to any toxic effect of the particle.

***"Health impacts due to particulate matter may be compounded in the presence of other air pollutants, such as sulfur dioxide."***

Exposure to high concentrations of particulate matter can contribute to the development of bronchitis and aggravate bronchial asthma. Children, smokers, and individuals with pre-existing ailments are more likely to be susceptible. In the same manner, health impacts of particulate matter can be compounded with the synergistic effects of exposure to other pollutants such as sulfur dioxide. Suspended particulate matter in the atmosphere also reduces visibility and can damage materials.

## Sulfur Dioxide

Sulfur dioxide ( $SO_2$ ) is a colorless, nonflammable gas. At concentrations above 3 ppm, the gas can be distinguished by its pungent irritating odor. Most sulfur dioxide emissions come from combustion sources, mainly power plants burning fuels which contain sulfur. When  $SO_2$  is emitted into the air, it can combine with water to form sulfuric acid or other sulfate particles. It is also a major contributor to acid rain.

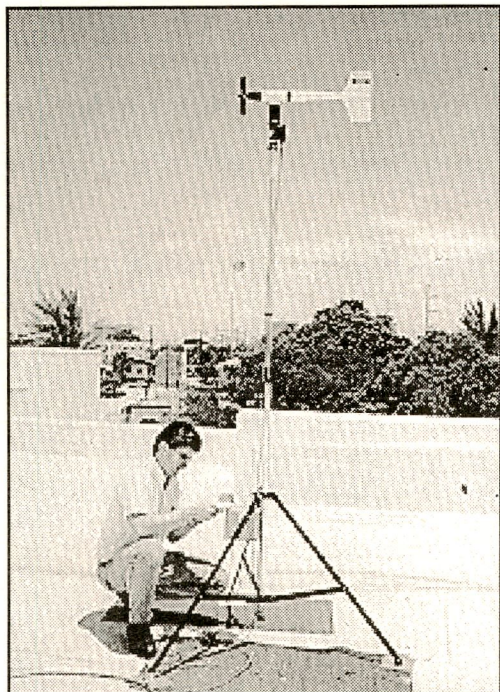
Sulfur dioxide primarily affects the upper respiratory system. It is usually removed by the nose, mouth and throat because of its solubility. Exposure to  $SO_2$  can cause the bronchial tubes to constrict. Most individuals will be affected by  $SO_2$  at concentrations of 5 ppm and above. However, some sensitive individuals, such as asthmatics, can show a response at concentrations as low as 0.25 ppm during vigorous exercise.

The overall health impacts of  $SO_2$  are not limited to direct exposure to the gas. The health effects from exposure to sulfuric acid aerosols or other sulfate particles may be of greater consequence.



### III. AIR QUALITY ASSESSMENT

#### Meteorology



*Paul Kalamaras checks the meteorological equipment.*

Palm Beach County can be classified as a semi-tropical region. The near permanent position of the subtropical high pressure area dominates our weather. It causes the prevailing easterly surface winds and supplies the warm, moist air necessary to produce the frequent evening rain showers and thunderstorms for which Southern Florida is known. The Atlantic Ocean borders the eastern edge of the county and the Gulf stream flows northward approximately three miles off-shore.

The subtropical high pressure area responsible for so much of the enjoyable weather in Palm Beach County is also capable of producing high pollution days. These days occur usually in December through April and result from cool, dry northern air moving underneath the existing subtropical warm moist air. This results in a temperature inversion, an increase in temperature with height. In effect, this traps pollutants in the lower atmosphere near ground level.

Afternoon sea breezes control the daytime weather for the eastern part of the county. Fronts form along the boundaries between hot western land breezes and slightly cooler moist eastern sea breezes. A distinct line of cumulus clouds develops just ahead of the sea breeze fronts. The combination of intense summer sun and very humid air aids in the formation of thunderstorms along, and ahead of, these fronts. These storms tend to move westward toward the inland areas. Occasionally, cooler and drier air masses push this far south to produce severe showers and thunderstorms when confronted with the local area's warm, moist air.

The county's "rainy season" lasts from May to October and coincides with the hurricane season from June 1st to November 31st. This wet weather is primarily due to the east-to-west movement of tropical weather systems from the Caribbean Sea and Atlantic Ocean. Dry northern winds may prevent this warm, moist air from advancing farther north and lead to local area droughts. These winds may also help steer away most tropical cyclones. However, they can be overridden by strong southern winds and low pressure from the eastern Gulf of Mexico which produces heavy rainfall.

Seldom does a cold air mass reach this region without being diminished by marine influences and our southern location. However, occasionally in December and January strong northern winds will push frigid, continental air down into the Florida peninsula. This produces the region's coldest weather, usually found in the Glades Area on the second night after a cold front. Frosts may occur if this weather persists for two to three days. The interior farmland receives a "freeze" about every third year.

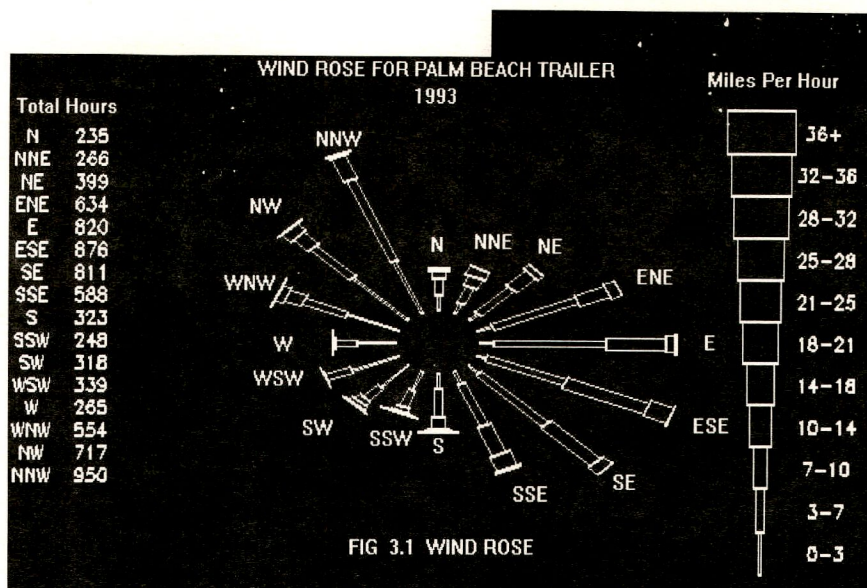
Meteorological parameters play a significant role in understanding the overall air pollution cycle. Wind direction and speed are of primary importance — especially within the first few hundred feet of the surface — in determining pollutant dispersion and movement. The wind direction indicates the pathway of the contaminants. The wind speed reflects the travel time to a receptor and is a factor in the dilution of a pollutant.

Other "high pollution" episodes may occur in summer, from April to October.



One high pressure system may center over the Gulf of Mexico while a second settles just off the southeast Florida coast. These competing systems create light surface winds prohibiting the development of sea breezes which would normally disperse pollutants in the lower 100 feet of atmosphere. Also, lower than normal rainfall during this period can cause dry, dusty conditions. This, combined with intense summer sunlight and stagnating high pressure systems, can cause higher than normal ozone levels. Wind data for Palm Beach County in 1993 is shown in Figure 3.1.

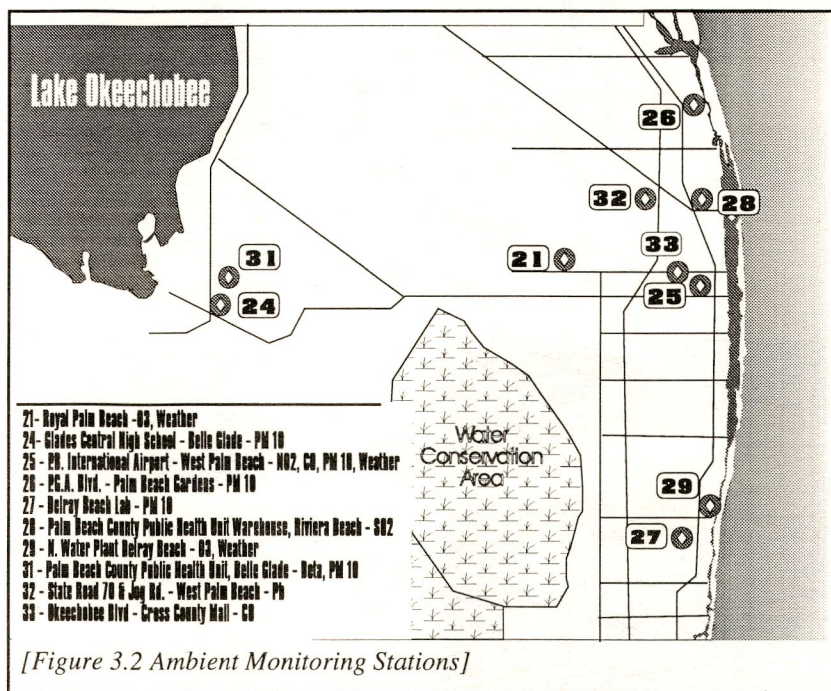
[Figure 3.1, Wind Rose]



## Ambient Air Monitoring

One of the most important functions of the Palm Beach County Public Health Unit's air program is to conduct ambient air monitoring. The data obtained is used to assess the overall air quality in Palm Beach County, and determines whether this area is in compliance with federal and state ambient air quality standards. Ambient air monitoring data is also used to evaluate the effectiveness of control strategies and the permitting program.

Monitoring is conducted throughout the county as indicated in Figure 3.2, which identifies the location of the monitoring sites and the pollutants monitored. The monitoring is performed by highly trained and specialized staff utilizing state-of-the-art equipment. For the gaseous pollutants, sensitive instruments are used to detect concentrations in the sub parts per million range. These instruments run continuously except for servicing or maintenance. The data collected from these instruments is stored on data loggers and is routinely tele-communicated via modem to the central data acquisition computer located in West Palm Beach. After the air monitoring data has been reviewed and validated, it is tele-communicated to the Florida Department of Environmental Protection which then forwards it to the U.S. Environmental Protection Agency.



All ambient air monitoring is conducted in strict accordance with federal and state quality control limits and procedures. It is the responsibility of the Health Unit's Quality Assurance Section to ensure that these requirements are met. The following sections describe the types and locations of monitors for each pollutant.



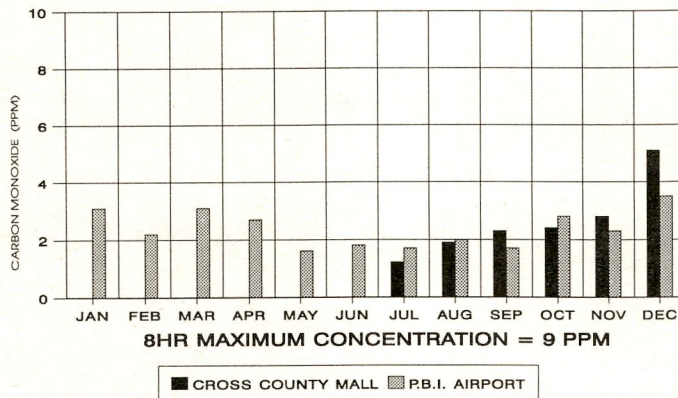
## Carbon Monoxide (CO)

To determine maximum CO concentrations, the monitoring stations are typically located near major roadways as the primary source of this pollutant is motor vehicle emissions. The Palm Beach County Public Health Unit operates two carbon monoxide monitoring sites in West Palm Beach, both designated as National Ambient Air Monitoring Stations (NAMS). One of the stations is located south of Belvedere Road near the Palm Beach International Airport (NO. 25). The second CO station was added in July of 1993 as required by federal regulations based on population derived from the 1990 census. This site (No. 33) is located on the south side of Okeechobee Boulevard and east of Military Trail, next to one of the busiest intersections in the county. Figure 3.3 indicates the maximum eight hour concentrations during a month for each station as compared to the standard, while Figure 3.4 shows the maximum one hour concentration compared to this standard. There have been no exceedances of the CO standards in Palm Beach County.

Highest CO concentrations usually occur on winter mornings. This coincides with peak traffic schedules, the coldest days, and weather conditions leading to a thermal inversion. Under these conditions, CO emissions are trapped near the ground, providing monitors with the highest readings.

### CARBON MONOXIDE 8 HOUR MAXIMUM CONCENTRATION

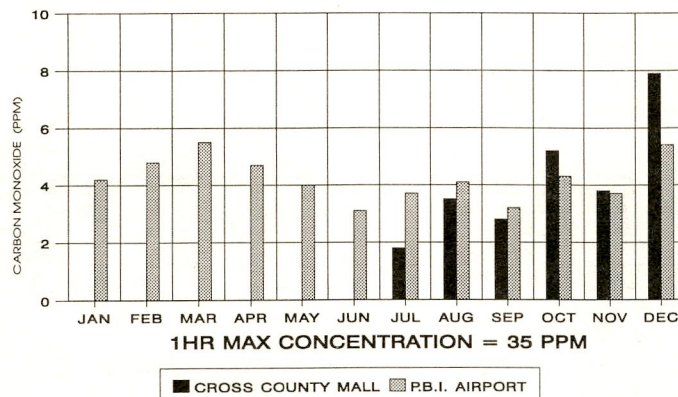
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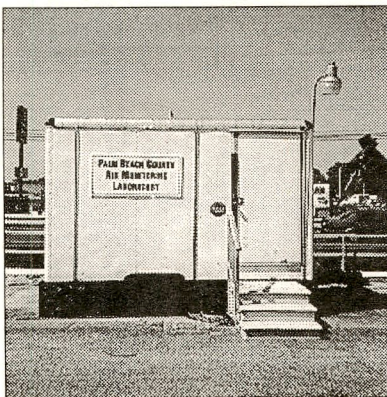
[Figure 3.3, Maximum 8 h.]

### CARBON MONOXIDE MAXIMUM HOURLY CONCENTRATIONS

1993



[Figure 3.4 Maximum 1 hr.]



Carbon Monoxide monitoring stations are typically located near major roadways.

## Nitrogen Dioxide (NO<sub>2</sub>)

Nitrogen dioxide is also measured at the West Palm Beach air monitoring station (No. 25). All values are well within the standards.

## Ozone (O<sub>3</sub>)

Ozone monitoring is conducted in Royal Palm Beach (site No. 21) and in Delray Beach (site No. 29). These sites are designated as NAMS sites. Figure 3.5 indicates the maximum hourly average concentrations for each month compared to the ozone standard of 0.12 parts per million. Highest ozone values typically occur in the late spring and summer months. Figure 3.6 identifies the highest ozone values recorded in Palm Beach County for the last 10 years.



As indicated in Figure 3.5, an exceedance of the ozone standard (i.e., >0.125 PPM) was recorded at the Delray Beach site in August of 1993. This was the first time the ozone standard was exceeded in the County in over ten years. However, this incident was not considered a violation of the ozone standard because the federal rule allows an average of one exceedance per year during a three year period.

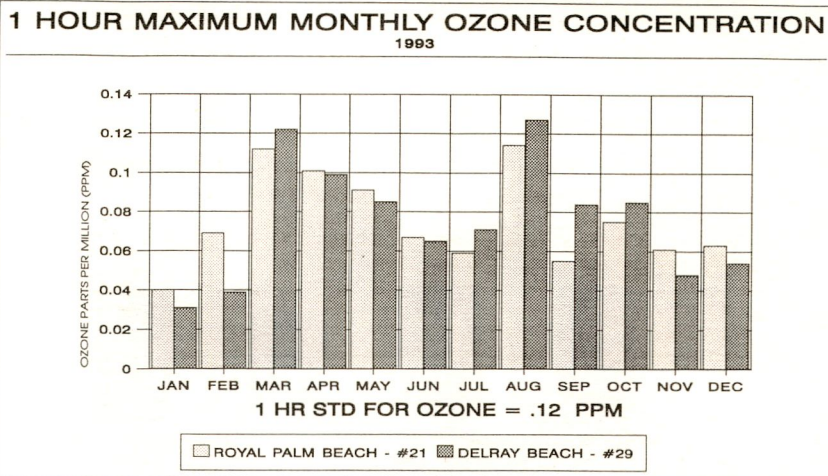
Palm Beach County is part of the Southeast Florida Urban Airshed that includes Dade and Broward Counties. This area is presently classified by the U.S. Environmental Protection Agency as a Moderate ozone nonattainment area. Based on the most recent data, the area is now in compliance with the ozone standard.

## Particulate Matter (PM)

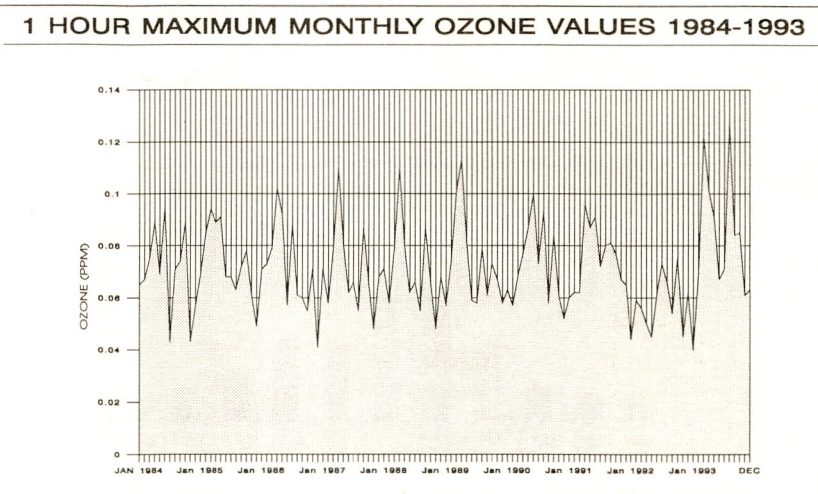
Particulate matter is monitored by employing high volume air sampling through a filter. The samplers are equipped with inlets to exclude particles greater than 10 microns ( $\mu\text{m}$ ) in aerodynamic diameter. Therefore, only particles with aerodynamic diameters equal to or less than  $10\mu\text{m}$  ( $\text{PM}_{10}$ ), the inhalable fraction, are collected on the filter.

The  $\text{PM}_{10}$  samplers operate for 24 hours every six days on a specified schedule. After each operation, the  $\text{PM}_{10}$  samplers are serviced and the filters changed. The exposed filters are returned to the laboratory for analysis.

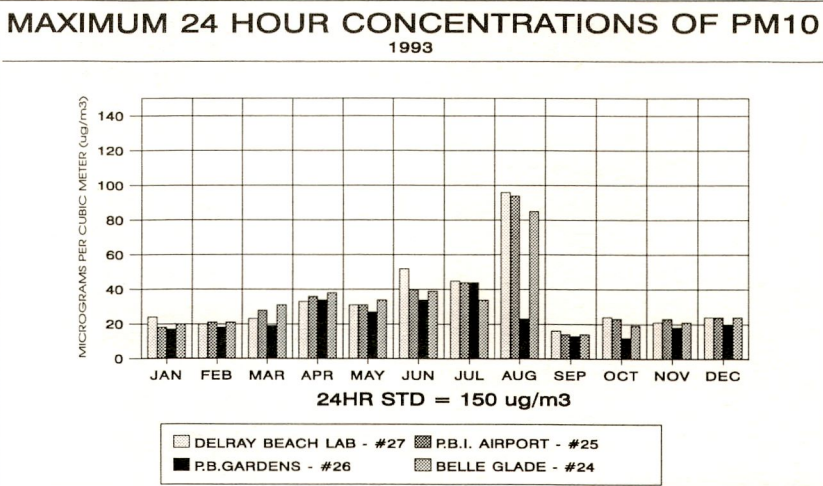
In 1993, the Health Unit operated 4 sites equipped with  $\text{PM}_{10}$  samplers. The coastal sites are designated as State and Local Air Monitoring Sites (SLAMS), and the Belle Glade site (No. 24) is designated as a NAMS site. Figure 3.7 indicates the maximum 24 hour concentration during a month for each station as compared to the standard of  $150\mu\text{g}/\text{m}^3$ .



[Figure 3.5]



[Figure 3.6]



[Figure 3.7]



Figure 3.8 shows 24 hour annual average for each station compared to the

standard of  $50 \mu\text{g}/\text{m}^3$ . Particulate matter concentrations tend to be elevated during conditions of dry weather and strong winds. The high levels during the month of August, as shown in Figure 3.7, were a result of long distance transport of dust from the Sahara Desert.

The Health Unit also employs a new technology for monitoring particulate matter. The system referred to as a Beta Attenuation  $\text{PM}_{10}$  monitor has the advantage of providing data on a continuous basis, rather than a daily value one every six days. One of these monitors was placed at site No. 25. The data from this site is telecommunicated to the data acquisition system located in West Palm Beach, and used for determining the daily air quality index. Another unit is located in Belle Glade, close to sugar cane fields and a sugar mill. The results of the monitoring indicated no violations of the  $\text{PM}_{10}$  standards.

## Sulfur Dioxide ( $\text{SO}_2$ )

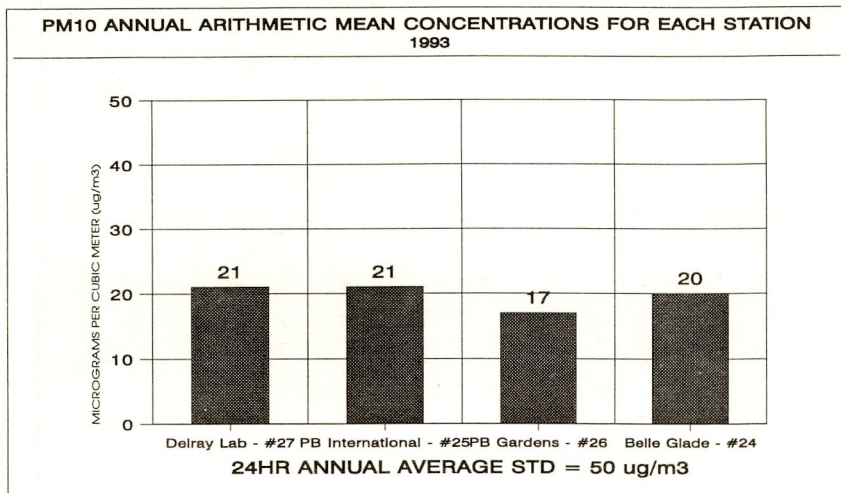
Sulfur dioxide is monitored at one site located in Riviera Beach. This site is downwind of prevailing winds from the FPL Riviera Beach Power Plant which is the major source of  $\text{SO}_2$  emissions in Palm Beach County.

However, it can be seen in Figure 3.9 that measured  $\text{SO}_2$  concentrations are well within ambient air quality standards. This pollutant is not of major concern in Palm Beach County.

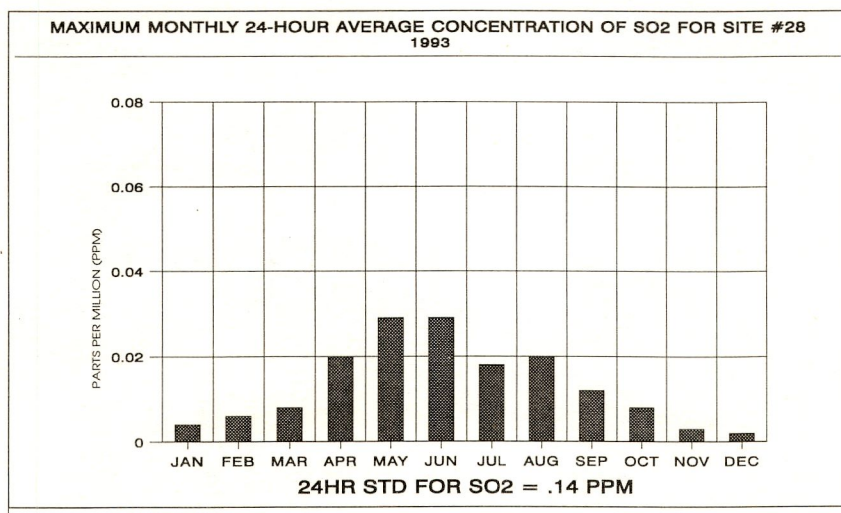
## Lead (Pb)

As a result of the 1990 Census, Palm Beach County was required by Federal Regulations to establish two lead monitoring sites. Lead is monitored by employing high volume air samplers similar to  $\text{PM}_{10}$  samplers but without an inlet excluding particles greater than  $10 \mu\text{m}$  in size. Samples are taken every 6th day on the same schedule as the  $\text{PM}_{10}$  monitors and returned to the laboratory to extract and analyze the lead content.

The Health Unit initiated lead monitoring during 1992. One site is located at the Palm Beach International Airport (Station No. 25). The other site (Station No. 32) is located approximately 2.2 miles north of the resource recovery facility



[Figure 3.8]



[Figure 3.9]



operated by the Palm Beach County Solid Waste Authority. This is the largest single source of lead emissions in the County. All lead samples analyzed during the year were below the minimum detectable limits, indicating ambient lead concentrations were relatively insignificant.

## Air Quality Index

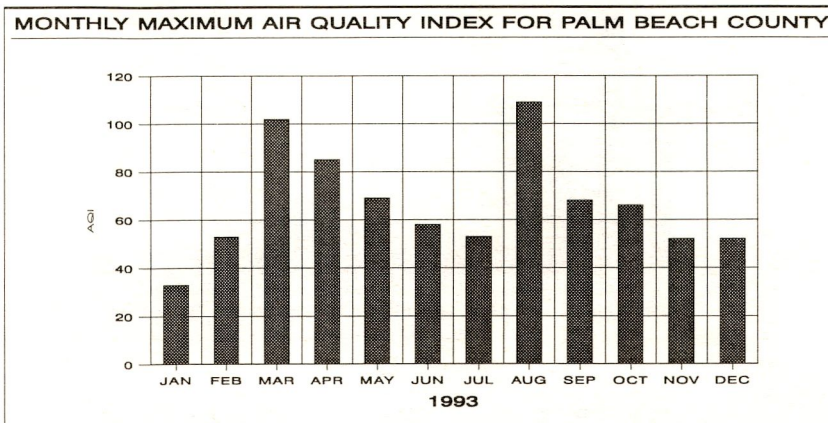
The Air Quality Index (AQI) is a uniform method of reporting daily air pollution concentrations and the associated health effects. The index is derived from the highest value of the five major pollutants monitored by the Health Unit: particulate matter, ozone, sulfur dioxide, oxides of nitrogen, and carbon monoxide. In Palm Beach County, particulate matter and ozone are the two predominant pollutants.

The AQI is based on the National Standard Scale spanning from 0-500 with a corresponding description range of:

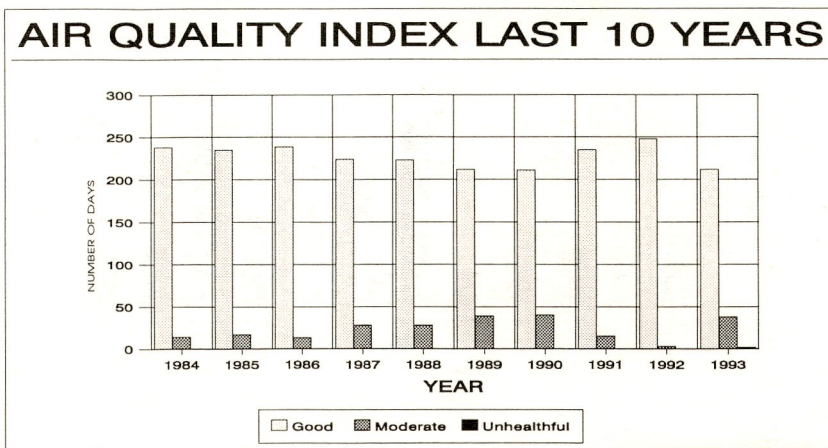
1 - 50	GOOD
51 - 100	MODERATE
101 - 199	UNHEALTHY
200 - 299	VERY UNHEALTHY
300 - 500	HAZARDOUS

Air quality in Palm Beach County is in the GOOD range 90% of the time and in the MODERATE range less than 10%. MODERATE air quality episodes of particulate matter may occur throughout the year, usually the result of heavy construction activity and dry weather. Ozone levels approaching the MODERATE range usually occur during the afternoon hours in Spring, Summer, and Fall. Stagnant weather conditions may also contribute to MODERATE level episodes. Figure 3.10 shows the monthly maximum Air Quality Index for Palm Beach County in 1993. As indicated, there were two (2) UNHEALTHY episodes last year. Figure 3.11 shows the number of GOOD, MODERATE and UNHEALTHY days for the last ten years. The air program staff produces a recorded message for the morning and afternoon AQI on Monday through Friday, and an afternoon AQI on weekends.

For the latest update of the Air Quality Index, call (407) 355-3962.



[Figure 3.10]



[Figure 3.11]



## Pollen and Mold Spore Count

The Palm Beach County Public Health Unit also provides a pollen and mold spore count. The pollen count is given a numerical value based on the amount and type of pollen collected in a 24-hour period. Data is reported in "grains of pollen or mold spores per cubic meter of sampled air." The pollen count is then compared to the following scale developed by the American Academy of Allergy and Immunology Aerobiology Committee:

0 - 20 ..... Low Count  
 21 - 200 ..... Moderate Count  
 Over 200 ..... High Count

A numerical scale for mold spores was established by the Health Unit based on several years of data:

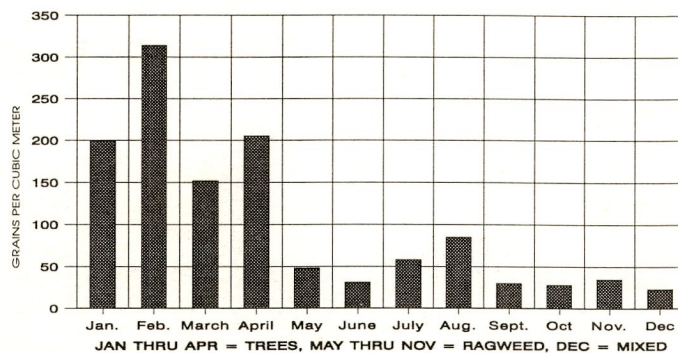
0 - 6,000 ..... Low Count  
 6001 - 12,000 ..... Moderate Count  
 Over 12,000 ..... High Count

The instrument used to measure the pollen/mold spore count is called a "Roto-Rod Sampler" and is the standard sampling device.

Figure 3.12 and 3.13 provide information on the maximum monthly pollen and mold spore count for the year. The predominant contributors to the pollen count are grass and weed pollen (May to October) and tree pollen (December to April). The mold spore count is affected by rainfall, generally increasing immediately after a storm and decreasing during dry periods. Palm Beach County receives the greatest amount of rainfall from May through October.

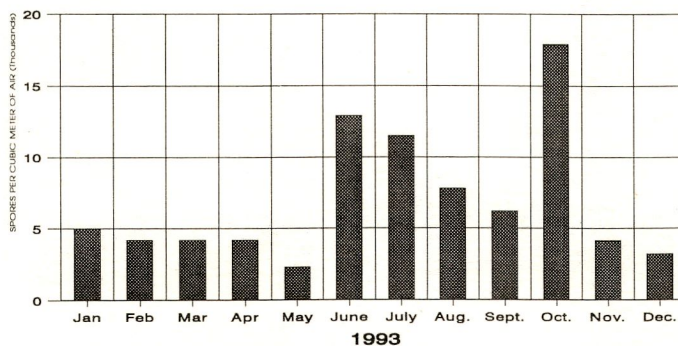
The PBCPHU updates the Air Quality Index and the Pollen/Mold Spore Count daily at 11:00 a.m. and 3:00 p.m. For the latest update, call (407) 355-3962.

### POLLEN COUNT 1993



[figure 3.12]

### MOLD SPORE COUNTS



[Figure 3.13]



## IV. SOURCES OF AIR POLLUTION

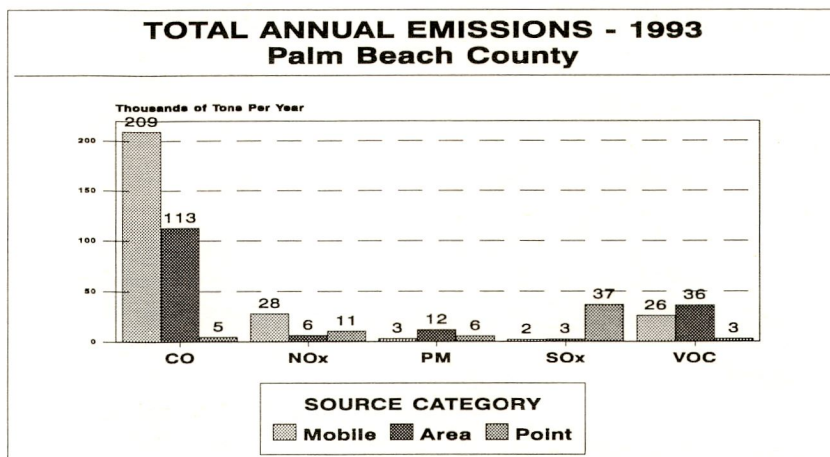
Air pollution is primarily caused by man's industrial and transportation activities. It is the undesired by-product of the technological advancement of our modern society. On the other hand, this modern society has also developed efficient methods to prevent and control atmospheric emissions of air pollutants. Emission contributions can be classified by three main categories of air pollution: stationary, mobile, and area sources. Figure 4.1 and 4.2 shows the contributions of each of these categories for various pollutants.

### Stationary Sources

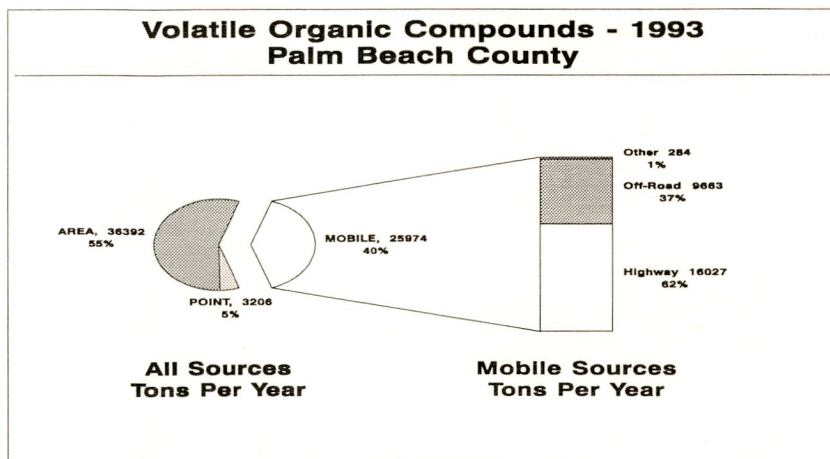
The major stationary sources of air pollution are most often industrial and are usually characterized by smoke stacks. In eastern Palm Beach County, the major stationary sources that emit over 100 tons of any one pollutant are: two electric power plants (FP&L Riviera Beach and Lake Worth Utilities) and a municipal waste combustor (Solid Waste Authority North County Regional Resource Recovery Facility). In western Palm Beach County, the major sources of air pollution are sugar mills. However, these mills only operate during the sugar cane harvesting season which generally runs from October through March.

Other significant stationary sources involving combustion processes include biomedical waste incinerators, asphalt plants, and commercial or industrial boilers. Several source categories have significant emissions of volatile organic compounds (VOCs). These include bulk gasoline plants, miscellaneous metal coating operations, polyester resin (fiberglass) fabrication, and electronic manufacturing. United Technologies, a major aircraft testing and manufacturing facility, is located in Palm Beach County and emits significant quantities of VOCs. Stationary sources of particulate matter include two Portland Cement terminals and numerous concrete batch plants.

Stationary sources generally reduce the amount of pollutants released into the ambient air through the installation of control equipment. Emissions can also be reduced through process changes which provide for more efficient operations, or by using cleaner fuels, or alternate coatings and solvents.



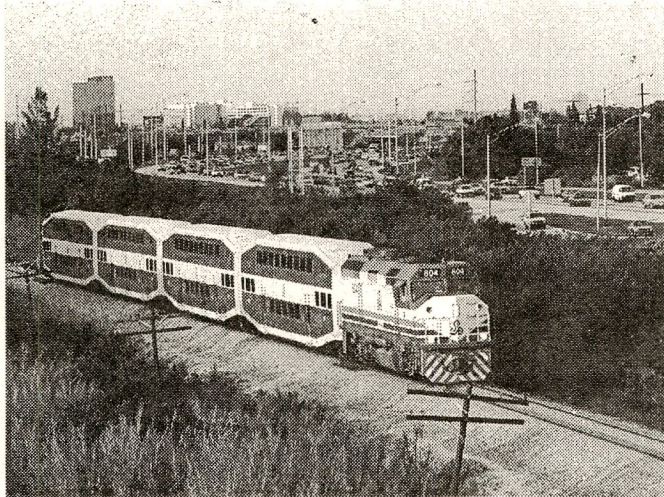
[Figure 4.1]



[Figure 4.2]



## Mobile Sources



*The Tri-County Commuter Rail is a good example of a transportation control measure.*

Mobile sources such as cars, planes, trains, and boats are the major contributors to our region's air pollution problems. Emissions from mobile sources, (mainly light duty gasoline-powered vehicles) contribute about 40% of the precursors of ozone formation. The large number of both automobiles and trucks is creating a burden on the existing transportation network thereby making control of these sources very difficult. Motor vehicle emissions can be controlled by keeping the vehicle pollution control devices in working order, and performing regularly scheduled engine maintenance. More efficiently operating vehicles and those operating on clean fuels (hydrogen, compressed natural gas, and electricity) can also help to reduce air pollution.

Mobile source pollution can also be reduced by providing a transportation network that minimizes congestion and reduces the number of vehicle miles traveled (VMT) by developing and improving mass transit systems. The Tri-County Commuter Rail (a commuter train that runs 67 miles between West Palm Beach and Miami) is a good example of a "transportation control measure" (TCM) to reduce VMT. Car and van pooling, flexible/staggered work hours, and preferential treatment for high occupancy vehicles are examples of other TCMs.

## Area Sources

Area sources are geographic localities with pollution problems stemming from the combined effects of various activities. Palm Beach County has many sources which emit small quantities of air pollutants which, collectively, can have a significant impact. This includes small point sources which are too small and/or too numerous to be surveyed and characterized individually. Dry cleaners, gasoline stations, open burning of land clearing debris, consumer solvents, architectural coatings, and dust from construction activities are just a few examples of area sources.

## Emission Inventory

A comprehensive emission inventory is an essential tool for any air pollution regulatory agency. The inventory provides information for the design of an ambient air monitoring program, identifies the relative contribution of the various pollution sources, and provides data for the development of control strategies and regional planning. A number of factors are used in compiling an emission inventory including fuel usage figures, process information, and accepted emission factors. Although the methods and factors are somewhat limited in precision, the emission inventory nevertheless, provides sufficient accuracy for the purpose and intent. The emission inventory in this report represents calculated emissions from major stationary point sources, and generalized estimates of emissions from mobile sources and area sources (Table 4.3).



1993 EMISSION INVENTORY SUMMARY					
SOURCES OF EMISSIONS	TOTAL EMISSIONS (TPY)				
	CO	NOx	PM	SOx	VOC
<b>Storage, Trans &amp; Mrktg of Petroleum Prod. and VOLs</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>1651.5</b>
Bulk Gasoline Plants	0.0	0.0	0.0	0.0	56.6
Barges, Tankers, Tank Trucks & Rail Cars in Transit	0.0	0.0	0.0	0.0	94.0
Service Station Loading (Stage I)	0.0	0.0	0.0	0.0	114.3
Service Station Loading (Stage II)	0.0	0.0	0.0	0.0	1386.6
<b>Industrial Processes</b>	<b>4202.2</b>	<b>2378.7</b>	<b>3457.4</b>	<b>2016.1</b>	<b>3166.2</b>
Plastic Products Manufacture	0.0	0.0	0.0	0.0	29.4
Concrete Terminals	0.0	0.0	2.5	0.0	0.0
Concrete Batch Plants	0.0	0.0	122.6	0.0	0.0
Electronics Manufacturing	0.0	0.0	0.0	0.0	15.4
Asphalt Batch Plants	8.2	13.7	3.8	37.5	6.0
Sugar Mill Processing	4194.0	2365.0	3328.5	1978.6	3115.4
<b>Industrial Surface Coating</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>2660.5</b>
Metal Coils	0.0	0.0	0.0	0.0	229.6
Metal Furniture	0.0	0.0	0.0	0.0	863.2
Miscellaneous Metal Parts and Products	0.0	0.0	0.0	0.0	992.4
Flatwood Products	0.0	0.0	0.0	0.0	137.7
Plastic Products	0.0	0.0	0.0	0.0	275.5
Large Ships	0.0	0.0	0.0	0.0	91.8
Large Aircraft	0.0	0.0	0.0	0.0	70.2
<b>Non-Industrial Surface Coating</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>3397.4</b>
Architectural Coatings	0.0	0.0	0.0	0.0	2111.9
Auto Refinishing	0.0	0.0	0.0	0.0	1056.0
Traffic Paints	0.0	0.0	0.0	0.0	229.6
<b>Other Solvent Use</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>11762.4</b>
Degreasing	0.0	0.0	0.0	0.0	1974.2
Dry Cleaning	0.0	0.0	0.0	0.0	826.4
Graphic Arts	0.0	0.0	0.0	0.0	596.8
Adhesives	0.0	0.0	0.0	0.0	137.7
Cutback Asphalt	0.0	0.0	0.0	0.0	169.9
Consumer/Commercial Solvent Use	0.0	0.0	0.0	0.0	2892.4
Pesticide Application	0.0	0.0	0.0	0.0	5165.0
<b>External Combustion Sources</b>	<b>113397.8</b>	<b>14259.1</b>	<b>14372.0</b>	<b>37758.2</b>	<b>16594.2</b>
Industrial Fuel Combustion	152.6	736.0	37.9	2088.4	10.8
Electrical Generation	364.4	6442.9	2307.9	34960.8	47.6
Commercial/Institutional Fuel Combustion	57.8	321.8	19.6	614.2	11.1
Residential Fuel Combustion	26.6	125.3	7.8	66.7	6.4
Resource Recovery Facilities (SWA)	153.8	1326.8	38.6	26.6	4.4
Sugar Cane Fields	99792.0	4928.0	10348.8	0.0	14784.0
Land Clearing	1765.4	50.4	214.4	0.0	239.6
Structure Fires	91.4	2.1	24.4	1.5	16.8
Auto Fires	4.0	0.1	3.2	0.0	1.0
Brush Fires	49.9	2.3	8.8	0.0	5.3
Wildfires	584.8	27.5	103.2	0.0	61.9
Controlled Burns	10355.1	295.9	1257.4	0.0	1405.3
<b>Stationary Internal Combustion</b>	<b>116.2</b>	<b>466.4</b>	<b>44.4</b>	<b>0.9</b>	<b>25.5</b>
Reciprocating Engines	1.2	4.7	0.4	0.2	0.3
Gas Turbines	115.0	461.7	44.0	0.7	25.2
<b>Waste Disposal</b>	<b>10.8</b>	<b>50.2</b>	<b>117.1</b>	<b>30.2</b>	<b>504.6</b>
Publicly Owned Treatment Works (POTWs)	0.0	0.0	0.0	0.0	290.0
Municipal Landfills	0.0	0.0	0.0	0.0	51.0
Air Curtain Incinerator, Stationary	0.9	37.8	105.4	12.9	153.6
Small Incinerators	9.9	12.4	11.7	17.3	10.0
<b>Mobile Sources</b>	<b>209280.3</b>	<b>28037.4</b>	<b>3328.6</b>	<b>2328.7</b>	<b>25974.0</b>
Highway Vehicles	137915.3	20363.4	2675.9	2259.0	16027.2
Non-Highway Vehicles	71365.0	7674.0	652.7	69.7	9946.8
Non-Road	69222.8	6537.2	636.5	0.0	9663.2
Aircraft	2050.9	373.5	0.0	19.5	246.9
Rail	87.3	687.3	16.2	50.2	29.5
Vessels	4.0	76.0	0.0	0.0	7.2
<b>TOTAL EMISSIONS - Palm Beach County</b>	<b>327007.3</b>	<b>45191.8</b>	<b>21319.5</b>	<b>42134.1</b>	<b>65736.4</b>

NOTE: The population in Palm Beach County for 1993 was: 918, 223

Table 4.3



## V. AIR POLLUTION CONTROL ACTIVITIES

The Palm Beach County Public Health Unit is responsible for a number of air pollution control activities including permit review, stationary source inspections, enforcement, the mobile source program, asbestos tracking, indoor air pollution, air pollution complaints, and open burn approvals. Each of these programs are described below. See Table 5.1 on following page for the activity summary of each component.

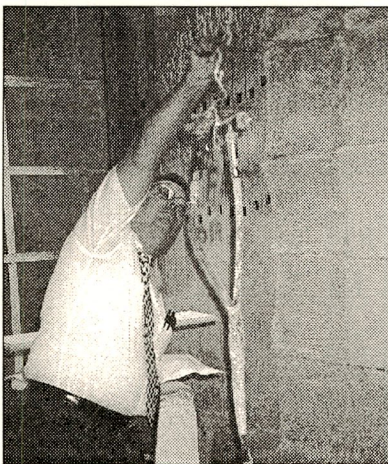
### Permitting

Many manufacturing and industrial processes emit air pollution in amounts significant enough to require a state permit from the Florida Department of Environmental Protection. The purpose of these permits is to track and regulate air pollution sources in order to:

- protect the public health and welfare
- protect the ambient air quality
- minimize air contaminants.

A permit is literally a contractual agreement in which the state allows a facility to discharge amounts of air pollution into the environment. A facility that operates beyond these specified limits may be subject to civil and possibly criminal charges.

On November 1, 1993 the Health Unit signed a Specific Operating Agreement with the Florida Department of Environmental Protection (FDEP). Part of this agreement delegated to the Health Unit the authority to issue and deny permits on behalf of FDEP. For most sources of air pollution in Palm Beach County, the Health Unit will be responsible for the review and processing of permit applications to construct, operate, renew, and modify. This agreement was effective January 1, 1994.



*Randy Miller checks for compliance during routine inspection.*

### Inspection and Compliance

Field compliance inspections are performed to insure adherence to permit conditions and environmental regulations. There are three main types of compliance activities:

Annual Facility Inspections are performed each year for all permitted sources in Palm Beach County. These inspections include a physical tour of the facility emphasizing stack emissions, air pollution control equipment, fuel usage, fugitive emissions, record keeping, and general facility conditions. The operating permit is reviewed and notes are made of any equipment, material, or process changes made during the past year.

Compliance Emission Stack Tests are required by some permits to verify that a facility is in compliance with the permit's specific conditions regarding emission limits. Palm Beach County inspectors witness all stack tests to insure that standard test procedures and protocol are followed.



**1993 ACTIVITIES SUMMARY  
Palm Beach County  
Air Pollution Control Section**

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**AIR POLLUTION PERMIT REVIEW**

Construction Permits .....	12
Operating Permits .....	22
Renewal Permits .....	12
Modifications .....	8

**STATIONARY SOURCE INSPECTIONS**

Major .....	52
Minor .....	69

**ENFORCEMENT**

Notice of Violation .....	21
Notice to Correct .....	9
Environmental Control Hearing Board Cases .....	12
Warning Notices .....	6
Consent Orders .....	6
Penalties Collected .....	\$ 16,130

**MOBILE SOURCE PROGRAM**

Used Car Lot Inspections .....	7
Stage I Vapor Recovery Delivery Inspection .....	9
Stage II Review .....	169
Stage I & II Certification/Inspection .....	69
Presentations .....	37
Investigations .....	19
Review of Development of Regional Impact (DRI) .....	0
Tampering/VE Complaints .....	32
MVIP Audit .....	4
CFC Inspection .....	15
Information Requests .....	105

**ASBESTOS**

Notifications .....	418
Demolitions .....	181
Approvals .....	60
Inspections .....	506

**COMPLAINTS ..... 845**


Odor .....	83
Smoke/Open Burning .....	67
Noise .....	16
Dust .....	53
Paint Overspray/Chemical Fumes .....	37
Asbestos .....	34
Sugarcane Burning .....	5
Indoor Air Section .....	550

**OPEN BURN APPROVALS**

Commercial .....	67
Residential .....	208

*Table 5.1*





Complaint Response Investigations are performed to determine whether a facility is responsible for causing a public complaint. Stack and fugitive emissions are observed. If a complaint is valid, an inspector may perform a detailed inspection to find the cause of the excess emissions. This may involve many of the same procedures used for an annual facility inspection. Inspection reports are added to the source files which contain permit, compliance, complaint, and enforcement information. Inspections are also logged into the DEP's computerized database. Unsatisfactory inspections would lead to some level of enforcement action.

## **Complaints**

Perhaps the most important function of the Air Pollution Control Section is to respond to citizen complaints. This provides a direct service to the public and alerts the Health Unit to problem areas. It is a policy that all air pollution complaints be investigated in a timely manner and resolved or referred to the appropriate party. The Air Pollution Control Section responds to numerous complaints throughout the year including smoke, odors, dust, and paint and pesticide overspray.

## **Enforcement**

A key element for successful compliance is a good enforcement program. Sources found out of compliance with permit conditions or state air regulations can be brought before the Palm Beach County Environmental Control Hearing Board. This board is a quasi-judicial regulatory body established by the Palm Beach County Environmental Control Act. The board holds public hearings for cases of non-compliance with environmental regulations. Alternatively, Florida statutes allow approved local programs, such as the Health Unit's, to pursue civil penalties up to \$10,000 per day, per violation.

## **Mobile Source Program**

The Mobile Source Program is responsible for implementing regulations designed to control emissions from cars, trains, planes, and boats — more commonly referred to as mobile sources. This is accomplished with regular inspections and aggressive enforcement by highly trained personnel. Used car lots, gasoline service stations, automotive service and repair facilities, and gasoline delivery vessels are a few of the local sources subject to compliance activities. A comprehensive "Emissions Inventory" is compiled annually for mobile sources.

Other "indirect sources" are evaluated and monitored through the Development of Regional Impact (DRI) review process and coordinated with the Treasure Coast Regional Planning Council (TCRPC). These sources include any large scale development projects which would increase traffic and air pollution.

The Mobile Source Program is also very involved with the transportation planning process at the local level, holding membership in the Metropolitan Planning Organization's (MPO's) Technical Advisory Committee and Bicycle/Pedestrian Advisory Committee and the statewide Transportation Control Measures (TCMs) Task Force.



The MPO is responsible for the long range transportation planning in the county. Planning efforts focus on promoting TCMs such as car and van pooling, flexible work hours, mass transit systems, public/private partnerships to increase urban mobility, and the integration of all modes of transportation. Many strategies are aimed at changing the individual's driving habits and decreasing single occupant vehicle trips. This will reduce the overall vehicle miles travelled, conserve fuel resources, reduce dependence on foreign oil, and improve our air quality.

## **Protecting the Ozone Layer**

Another concern having global implications is the destruction of the earth's upper level protective ozone layer by chlorofluorocarbons, more commonly known as CFCs. These ozone destroying compounds are primarily used throughout the world as refrigerants for automobile, residential and commercial air conditioning (AC) units, as well as foaming agents. These compounds usually enter the atmosphere from leaking AC systems and from intentional venting during service and maintenance.

To address the problem nationally, the Clean Air Act Amendments (CAAA) of 1990 require that ozone depleting CFCs be phased out by the year 1995 and replaced with safe substitutes. Additionally, the Montreal Protocol, an international agreement designed to control the production and consumption of CFCs worldwide, was signed in 1987 by the USA, Canada, twenty-four major industrialized nations, and the European Economic Community. The Protocol calls for a 50% reduction in use of CFCs by 1998.

Recent scientific data shows that the destruction rate of the ozone layer is even greater than previously thought. An "ozone hole" similar to the one discovered over the Antarctic region is expected to form over the populated regions of North America within the next decade. This alarming development led former President Bush to call for an acceleration in the CFC phase out to 1995 instead of the year 2000 as required by the CAAA. It has also been documented that some CFCs have an atmospheric life of over 120 years. In other words, once they enter the upper atmosphere they do not break down easily. CFCs repeatedly attack and destroy the protective ozone layer.

Experts have also concluded that the atmosphere's ability to defend itself against ozone depleting chemicals has been overestimated. The resulting increase in unfiltered UV radiation to the earth's surface could lead to adverse health effects including more skin cancers, cataracts, and even suppression of the human immune system. Negative environmental effects such as changes in weather patterns, and stress on marine and plant life from increased exposure to UV radiation are also very possible in the near future.

Locally, the PBCPHU will assist with the enforcement of a state law that prohibits the release or venting of CFCs during maintenance and service of automobile air conditioning systems. The law which became effective July 1991 also requires licensing of AC service shops, training of technicians and certification of CFC recovery and recycling equipment. In July 1992, similar federal requirements were also extended to cover stationary residential and commercial AC units. The air program staff has initiated an aggressive campaign to notify appliance salvage operations of the new requirements.



## Asbestos

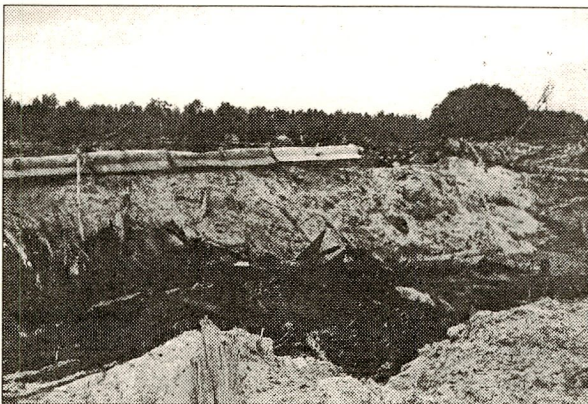


*Walt Richards performs an asbestos demolition inspection in full protective gear.*

Asbestos exposure has been shown to cause a number of diseases including asbestosis, lung cancer, and mesothelioma, a rare and usually fatal cancer. The health risks associated with asbestos have resulted in federal regulations contained in the National Emission Standards for Hazardous Air Pollutants (NESHAP). The Palm Beach County Public Health Unit is the lead agency for enforcing these regulations in Palm Beach County. The NESHAP regulations include notification requirements and standards for the handling and disposal of asbestos containing materials. The Health Unit issues written approvals for asbestos abatement projects and conducts inspections to ensure that all NESHAP requirements are being adhered to as well as other applicable federal and state regulations for this activity. The PBCPHU also routinely inspects buildings to verify that there will be no threat of asbestos fibers being released into the air during demolition activities.

## Open Burning

In Palm Beach County, the open burning of vegetative debris is allowed for land clearing purposes. This activity is a one-time operation associated with clearing a property for the construction of a commercial business or private residence. To minimize the air pollution generated by this activity, the Health Unit inspects all commercial and residential land clearing open burning projects. After an inspector verifies that the proposed project will meet all applicable air pollution regulations, the Health Unit issues an approval letter. The approval letter is required by Palm Beach County Fire Rescue and the municipal fire departments in order to issue a burn permit for the construction site. The Health Unit and the fire departments work closely together to monitor all open burns. Any project creating a nuisance or health threat will be suspended and enforcement action pursued.



Air curtain incinerators are used to minimize smoke while destroying land clearing debris.

## Indoor Air Quality

People generally spend the majority of their time indoors. Pollutants can become trapped indoors and build up to levels greater than those outdoors. Sources of indoor air pollution may come from inside buildings or from the infiltration of polluted outdoor air. The Division of Environmental Health conducts surveys and investigations of health related complaints in occupational and residential buildings on request. Advice and recommendations are made for the improvement of indoor air quality.

Mold and mildew growth can cause allergic reactions in sensitive individuals. Moisture intrusion from water leaks or moist warm outdoor air infiltration can cause relative humidity control problems resulting in mold/mildew growth. Inadequate air conditioner maintenance can lead to the spread of mold/mildew spores and odors throughout the space.

Airborne contaminants from building activities such as cigarette smoking,



painting, and production by-products can not only cause problems for the generators, but can infiltrate into neighboring adjacent occupied spaces such as businesses in strip malls, industrial bays and apartments. The Division has the ability to sample for a variety of gases and particulates to help determine the exposure level of pollutants. Areas of expertise include the following:

- \* Carbon monoxide from combustion sources.
- \* Volatile organic compounds from paints, solvents, cleaning compounds, etc.
- \* Hydrogen sulfide (sewer gas component) from plumbing vents, drains, and sulfur-containing well water.
- \* Formaldehyde from mildew retardants, plywood, and laboratories.
- \* Airborne lead from indoor firing ranges.
- \* Particulates from industrial sources.
- \* Mercury vapor exposure of dentists.
- \* Airflow assessment for the prevention of tuberculosis transmission.

Cleaning, repair, increased ventilation, and substitution are common recommendations for solving indoor air quality problems.

Outreach activities have included the hosting of a half day EPA Building Air Quality course attended by approximately 200 people and a two and a half day EPA Orientation to Indoor Air Quality course attended by 80 people. Information on the health effects and measurement of radon, a natural occurring radioactive soil gas which can enter buildings through foundation openings and build up indoors, is distributed. Inspections to determine compliance with the Florida Clean Indoor Air Act regarding the designation of smoking areas are performed at the request of the HRS-Cancer Epidemiology Office.

*For more information on Indoor Air Quality please contact the Division of Environmental Health at (407) 355-3015.*

## VI. PUBLIC INFORMATION

A Public Information Program (PIP) is also provided by the PBCPHU Air Pollution Control Section to better inform the regulated public and private communities of compliance requirements and the dangers of air pollution. The focus of this program is to establish a "pro-active" approach through pollution prevention rather than assuming a "reactive" posture. Presentations are routinely provided to businesses, automobile trade associations and even to local elementary school children.

An example of a PIP is the "Environmental Problems and Conservation Solutions" program which was jointly developed by the Health Unit and the American Lung Association of Southeast Florida. This program is designed for young students and attempts to raise their awareness towards protecting the environment through conservation of natural resources. Since 1991, the program has been presented in many public and private schools throughout the county. It has also been presented to civic groups such as the Boy and Girl Scouts of America, the Audubon Society and local rotary clubs. Whenever possible, arrangements are made with the local media to cover PIP activities during special events such as Clean Air Week, Car Care



*Our Public Information Program keeps the public informed on new developments related to air pollution.*





*Events such as the PBC Envirothon raise students awareness on environmental issues.*

This year the Health Unit participated with many other agencies in the Palm Beach County Envirothon. The focus of this event was raise student awareness of protecting the environment through the conservation of existing natural resources.

The Envirothon was established sixteen years ago as a competitive, problem solving event for high school students to challenge them on issues concerning the environment. Now in its third year locally, student teams are provided with resource materials and are tested in five areas: soils, water resources, forest ecology, wildlife, and current issues. In addition to taking five group tests, the teams have to complete an "action project," related to an environmental issue. The top four winning teams will advance to the state finals. The winning team from the State Envirothon will go on to serve as representatives at the National Envirothon.

## VII. NEW DEVELOPMENTS

### Cogeneration Projects

For more than thirty years, the sugar industry has been growing sugar cane and operating sugar mills in western Palm Beach County. In 1992, two of these companies, Okeelanta Corporation and Osceola Farms Company, proposed to replace the aging boilers, steam turbines, and other related equipment with state-of-the-art facilities using the latest in power generation and environmental control technology. These projects are described as "cogeneration facilities" because they will not only produce process steam for use in the mills, but will also sell electrical power to Florida Power & Light Company. Both the federal and state governments have encouraged the development of cogeneration projects through legislation requiring electric utilities to interconnect and purchase power from these facilities. The purpose of these requirements is to support renewable alternative fuels and to conserve expensive petroleum or fossil fuels.

The new proposed cogeneration facilities will burn biomass fuels - a combination of bagasse and wood chips - with coal as an emergency backup fuel. Bagasse is the fibrous plant residue remaining after the sugar cane is processed. Historically, bagasse has been burned in external combustion boilers to reduce the solid waste and to produce steam for the milling process. Wood chips will be supplied from land clearing operations throughout Palm Beach County and the surrounding area. Clean, vegetative debris and lumber will be chipped for use as boiler fuel. Since the availability of the wood chip supply is uncertain, coal was selected as a reliable emergency backup fuel and was required for the financial support of the project. The use of coal has the potential to cause an increase in sulfur dioxide emissions over the existing levels. However, current plans do not even consider the initial installation of coal handling equipment or coal storage.

The new facilities will be known as Okeelanta Power Corporation and Osceola Power Corporation. In 1993, the Florida Department of Environmental Protection issued construction permits for these potential major sources of air pollution. Specific conditions of the permits included the following control equipment:



- Electrostatic precipitators to control particulate matter
- Modern boiler technology and control resulting in high combustion efficiency to limit carbon monoxide and volatile organic compound emissions
- Selective non-catalytic reduction system to control nitrogen oxides
- Activated carbon injection system to reduce potential mercury emissions.

Using renewable biomass fuels, the new facilities are expected to produce fifteen times more electrical energy with less air pollution than the existing facilities.

## Air Toxics Update

Title III of the 1990 Clean Air Act Amendments designated 189 different chemicals as hazardous air pollutants (HAPs). These compounds are pollutants that are widely considered to be toxic and that might cause cancer or other adverse health effects. The Environmental Protection Agency (EPA) believes that this specific list of HAPs will allow the agency to focus on control techniques rather than debating the toxicity of a limitless number of chemicals. Prior to these amendments, the EPA had promulgated National Emissions Standards for Hazardous Air Pollutants (NESHAPs) for only seven HAPs due to the lengthy determination process. As a result of Title III, at least 174 separate source categories of air pollution will be subject to NESHAPs by November 15, 2000.

The control of HAPs will involve a two step approach. The first step is to promulgate technology-based standards using the Maximum Achievable Control Technology (MACT) for each source category. The MACT standard for existing sources will equal the best-controlled 12% of the existing sources. New sources must equal the best-controlled similar source. The second step will be to establish residual-risk standards for sources with MACT standards that do not adequately protect the public health or the environment. Within eight years after establishing a MACT standard, EPA must determine whether or not the technology-based standards provide an ample margin of safety. If not, EPA must promulgate additional risk-based standards for those source categories.

On September 22, 1993, the EPA enacted the first new NESHAP standard due to Title III for perchloroethylene (PCE) dry cleaners. This standard requires new and existing dry cleaners with the potential to emit 10 tons per year or more of PCE to implement MACT. In addition, dry cleaners with the potential to emit less than 10 tons per year of PCE will be classified as area sources and must control emissions to a standard of Generally Available Control Technology (GACT), or best management practices. Currently, the Florida Department of Environmental Protection is compiling a state wide inventory of dry cleaning facilities, and will most likely require state air permits in the near future. Palm Beach County has approximately 130 existing dry cleaning facilities that will be affected by this rule. It is believed that most of these facilities will be subject to GACT and therefore, may only be required to obtain a general permit. Other categories for which standards are expected to be made final in 1994 are hazardous organic chemical manufacturing, coke ovens, and chromium electroplating.

Currently, the Air Pollution Control staff is locating and identifying potential sources of air toxics for possible future permitting in accordance with these upcoming standards.



## URBAN AIR TOXICS MONITORING

The Health Unit continued the urban air toxics monitoring (UATM) project that was initiated the previous year. The purpose of this project was to obtain data for a number of air pollutants that are not monitored and considered to be hazardous.

In 1993, UATM was performed in central Palm Beach County near the intersection of State Road 7 and Belvedere Road. This site was selected because it is downwind of the major urban area for prevailing winds, and close to a light industrial area with several significant sources of air toxics. For this study, a total of ten samples were collected approximately every two weeks during the months of August through December.

Air toxics monitoring utilizes a special canister system to collect air samples for 37 gaseous hydrocarbon and halogenated species. A number of aldehyde species were also collected using a special cartridge system. The analyses for these air toxics samples require very sophisticated and expensive equipment with highly specialized operators. For this reason, arrangements were made to have the samples analyzed at the HRS Office of Laboratory Services in Jacksonville, Florida.

TABLE 7.1  
URBAN AIR TOXICS MONITORING STUDY

AIR TOXIC SPECIES	COUNT <sup>1</sup>	MAXIMUM VALUE ppbv	MINIMUM VALUE ppbv	MEAN VALUE <sup>2</sup> ppbv
Methylene Chloride	3	1.60	0.29	0.47
1,1,1Trichloroethane	4	1.50	0.20	0.38
Benzene	5	0.51	0.21	0.23
Toluene	8	3.50	0.23	0.86
Ethylbenzene	2	0.33	0.21	0.14
M/P-Xylenes	8	0.99	0.22	0.39
O-Xylenes	3	0.39	0.21	0.16
Chloromethane	9	0.64	0.24	0.37
Trichloroethylene	1	0.22	0.22	0.10
Tetrachloroethylene	1	0.34	0.34	0.12
Styrene	1	0.26	0.26	0.10
Paradichlorobenzene	1	0.41	0.41	0.13

- 1.Total number of samples detected above the minimum detection limit out of 10.  
1100 State Road No. 7, West Palm Beach
- 2.Mean calculated using one half the detection limit for those samples below this level. ppbv = parts per billion by volume.

Table 7.1 summarizes the results of the hydrocarbon air toxics monitoring for this site. These results are similar to studies conducted in other urban areas except they are generally lower indicating the county does not have a significant air toxics problem. A number of the compounds detected (i.e., benzene, xylene and toluene) are components of gasoline indicating a likely source to be evaporative emissions from automobiles in the vicinity of the sampler.



## Alternative Fuels Demonstration Project

The Health Unit's Division of Environmental Science & Engineering assisted Palm Beach County Fleet Management Division in preparing and submitting a grant proposal to the Florida Energy Office's State Energy Conservation Program. The County was awarded a grant of \$228,000 and ranked #1 out of 36 proposals. The grant will be used to construct a compressed natural gas (CNG) "quick fill" refueling station at the County's Fleet Management Facility. The station is needed to fuel county vehicles already converted by Fleet Management technicians. CNG is cheaper, burns cleaner than gasoline, and is also domestically available. This lessens our dependence on foreign oil imports.

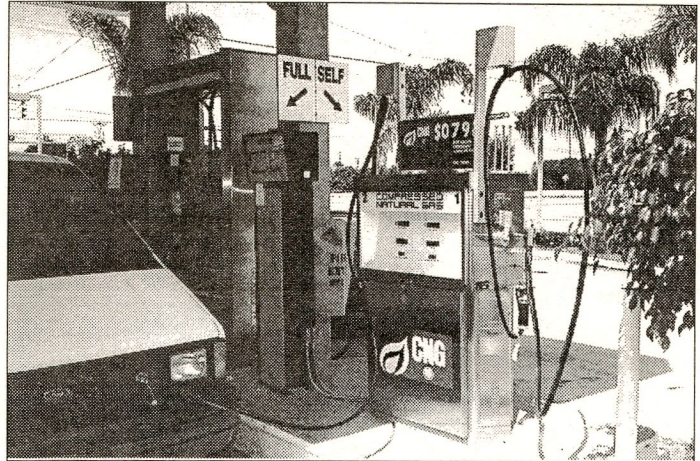
Within the next year, additional vehicles are scheduled for conversion to CNG with \$100,000 that has already been set aside into a special vehicle conversion trust fund. The \$100,000 was transferred from the Health Unit to Fleet Management, in August of 1993. This money was originally generated from fines collected from environmental violators in PBC. With a total operating budget of \$338,000, the Alternative Fuel Vehicle (AFVs) program appears to be on the "road to success," and is expected to yield both environmental and economic benefits for the citizens of the County.

The push towards AFVs is also receiving support at the state and federal level. In September 1993, Governor Chiles' Executive Order #93-278 created The Florida Gold Coast Clean Cities Coalition. Palm Beach County, along with Broward and Dade Counties, jointly participates in the Coalition. The goal of the Coalition is to maximize the number of AFVs operating on the roads of South Florida, and to promote the advantages of AFVs through media events and technology transfer.

## Stage II Vapor Recovery Systems

In December, 1992 the Florida Department of Environmental Protection finalized Stage II Vapor Recovery rules for Dade, Broward and Palm Beach Counties. Most major gasoline dispensing facilities in the three county area must install Stage II Systems no later than November 1994. These recovery systems include hoses and nozzles which are designed to capture gasoline vapors generated during vehicle refueling. The captured vapors are then returned to the dispensing station's underground fuel storage tanks where they may be condensed back into liquid gasoline. Approximately one third of the gasoline facilities subject to Stage II were fully operational in Palm Beach County as of December, 1993.

It is estimated that when fully implemented, Stage II systems will recover over 700,000 gallons of gasoline vapors annually in Palm Beach County alone. Exposure to toxic components of gasoline such as benzene, a known human carcinogen, will also be greatly reduced with the use of Stage II systems. The Health Unit's Mobile Source Program will be responsible for administering a certification and licensing program to insure compliance with the new regulation.



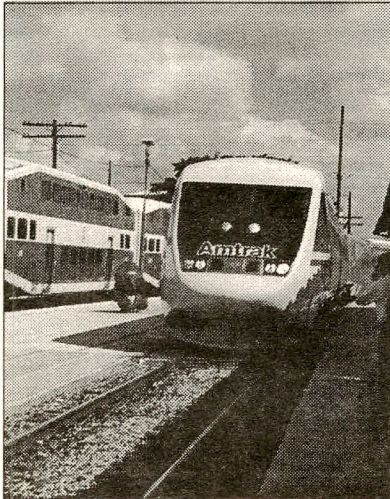
*The County currently has 18 vehicles which operate on Compressed Natural Gas.*



*Approximately one-third of the gasoline facilities subject to Stage-II were fully operational in Palm Beach County in 1993.*



## Future Clean Air Transportation Systems



*The proposed High Speed Rail and Tri-Rail are examples of mass transit TCM's.*

The Clean Air Act Amendments (CAAA) of 1990 added significant importance to the relationship between transportation activities and air quality. To promote the development of transportation systems which reduce vehicle miles travelled (VMT), related fuel consumption, and air pollution, there have been several key projects proposed/scheduled in the county:

- Downtown West Palm Beach Transit Transfer Facility. Recently, the Metropolitan Planning Organization (MPO) selected the site for a central transit hub adjacent to the West Palm Beach Tri-Rail station. This facility will be critical in the multimodal transportation system linking the Port of Palm Beach, Palm Beach International Airport, Amtrak, Tri-Rail and the proposed High Speed Rail. Additionally, it will serve buses, bicycles, pedestrians, and autos.

- Proposed Northward Extension for the Tri-County Commuter Rail (TCCR). Primarily designed for the tri-county to service the Veterans Administration (VA) Hospital, this facility is also expected to serve populations from outside the region as well. Land around this project is sparsely developed and provides a unique opportunity to jointly develop a station site with the private sector using transit oriented design (TOD).

- Proposed High Speed Rail. This system would serve the Miami - Orlando - Tampa corridor with a proposed stop at the West Palm Beach station. This project ensures regional accessibility to major attractions in the tri-county area.

- CoTran Service Enhancements. This past July, local option gas tax revenues were committed to a full grid system offering optimum bus services with additional routes and improved headways. When fully implemented, these enhancements are expected to add an additional 5.8 million passenger trips to CoTran annually.

## Ozone Air Quality Update

In 1993, Health Unit air program staff was heavily involved in a number of activities dealing with the County's ozone nonattainment status. As a result of the CAAA, a comprehensive inventory was completed of sources and their 1990 emission levels of the pollutants that contribute to the formation of ozone. This inventory was combined with the emission inventories of Dade and Broward counties, and will be used as a baseline to evaluate future emissions in the Southeast Florida airshed. These inventories were presented at a DEP public hearing prior to being submitted to EPA for approval.

For the last several years air quality data for the Southeast Florida area has been demonstrating compliance with the ozone standard. Therefore, it was decided by state and county officials to submit a request to EPA to have Southeast Florida redesignated from nonattainment to "attainment".

Seeking redesignation this year had the benefit of staying the requirement for submitting an attainment plan to EPA. This plan would have to demonstrate significant emission reductions from the 1990 levels, by 1996. To achieve the necessary reductions additional and more costly control measures beyond those currently adopted would be required.

As part of the redesignation request, a maintenance plan is required to ensure continued compliance with the ozone standard. The maintenance plan identifies the control measures to be retained for this purpose. For Southeast Florida, these include the Motor Vehicle Inspection Program, Stage II vapor controls at gasoline



dispensing facilities, and the requirement for stationary sources to have Reasonable Available Control Technology (RACT). The maintenance plan must also show that future emissions will not exceed the 1990 baseline levels on which attainment is based. For this, Health Unit staff made a projection of ozone precursor emissions to the year 2005 by estimating growth and considering the effects of existing and future control measures.

The emission projections for volatile organic compounds (VOC) and nitrogen oxides (NOx) are summarized in Tables 1 and 2, respectively. From these tables it is apparent that overall, future emissions will be lower than 1990 levels. These results are consistent with the projections for Dade and Broward counties, however greater NOx reductions are indicated for these two counties. In both tables, the greatest reductions are found in the on-road mobile source category. This is a result of future replacement of older vehicles with newer and less polluting ones.

**TABLE 1**  
**PALM BEACH COUNTY VOC EMISSIONS<sup>1</sup> (TONS/DAY)**

YEAR	ON-ROAD MOBILE	NON-ROAD MOBILE	STATIONARY SOURCES	AREA SOURCES	TOTALS
1990	70.20	26.05	1.16	84.06	181.47
1994	43.49	28.42	1.22	84.84	157.97
1997	40.53	30.65	1.29	81.30	153.77
2000	38.04	32.54	1.36	79.02	150.96
2005	37.54	32.54	1.51	78.29	149.88

1. Biogenic Emissions Excluded

**TABLE 2**  
**PALM BEACH COUNTY NO<sub>x</sub> EMISSIONS (TONS/DAY)**

YEAR	ON-ROAD MOBILE	NON-ROAD MOBILE	STATIONARY SOURCES	AREA SOURCES	TOTALS
1990	56.58	18.27	37.78	4.19	116.82
1994	54.27	19.92	42.45	4.40	121.04
1997	53.02	21.47	33.75	4.59	112.83
2000	51.47	22.81	34.52	4.74	113.54
2005	50.88	25.35	34.54	5.03	115.80

The maintenance plan was supported by the Palm Beach County Board of County Commissioners through a Resolution adopted on August 17, 1993, went before a DEP public hearing on September 30, 1993 and submitted to EPA on November 8, 1993. We hope that EPA will support and approve the redesignation request as submitted.



# GLOSSARY OF TERMS

<b>AQI</b> .....	Air Quality Index	<b>NO</b> .....	Nitric Oxide
<b>AFV's</b> .....	Alternative Fueled Vehicles	<b>NOx</b> .....	Nitrogen Oxides
<b>CAAA</b> ....	Clean Air Act Amendments (of 1990,Federal law)	<b>NO<sub>2</sub></b> .....	Nitrogen Dioxide
<b>CFC's</b> .....	Chlorofluorocarbons	<b>O<sub>3</sub></b> .....	Ozone
<b>CNG</b> .....	Compressed Natural Gas	<b>PBCPHU</b>	Palm Beach County Public Health Unit
<b>CO</b> .....	Carbon Monoxide	<b>PCE</b> .....	Perchloroethylene
<b>DEP</b> .....	Department of Environmental Protection	<b>PM</b> .....	Particulate Matter
<b>DRI</b> .....	Development of Regional Impact	<b>PIP</b> .....	Public Information Program
<b>EI</b> .....	Emissions Inventory	<b>PPM</b> .....	Parts Per Million
<b>EPA</b> .....	Environmental Protection Agency	<b>SLAMS</b> ...	State and Local Air Monitoring Stations
<b>GACT</b>	Generally Available Control Technology	<b>SOA</b> .....	Specific Operating Agreement
<b>HAP's</b> ....	Hazardous Air Pollutants	<b>SO<sub>2</sub></b> .....	Sulfur Dioxide
<b>MACT</b> ....	Maximum Achievable Control Technology	<b>TCCR</b> ....	Tri County Commuter Rail
<b>MPO</b> .....	Metropolitan Planning Organization	<b>TCM</b> .....	Transportation Control Measures
<b>NAAQS</b> ..	National Ambient Air Quality Standards	<b>TCRPC</b> ...	Treasure Coast Regional Planning Council
<b>NAMS</b> ....	National Ambient Air Monitoring Stations	<b>TOD</b> .....	Transit Oriented Design
<b>NESHAP</b>	National Emission Standards for Hazardous Air Pollutants	<b>µg/m<sup>3</sup></b> .....	Micrograms Per Cubic Meter
		<b>VMT</b> .....	Vehicle Miles Traveled
		<b>VOC</b> .....	Volatile Organic Compounds



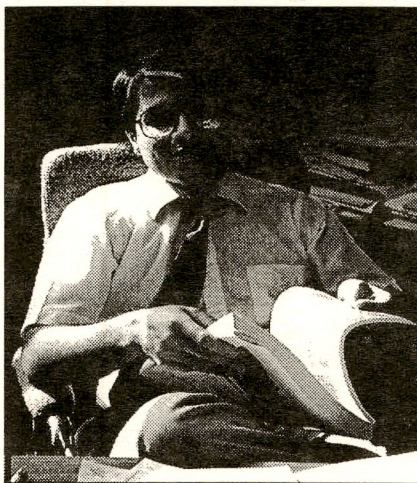
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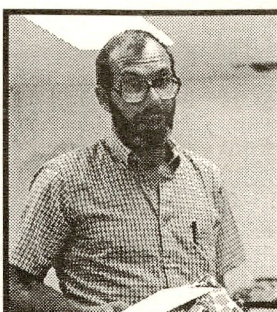
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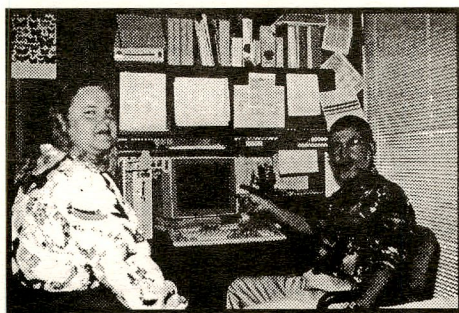
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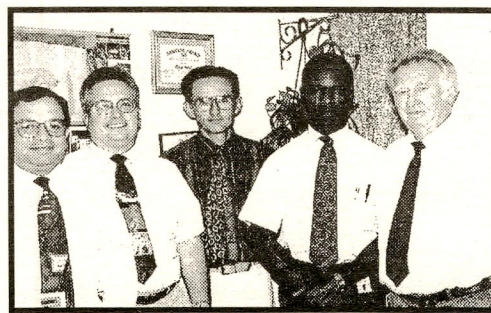
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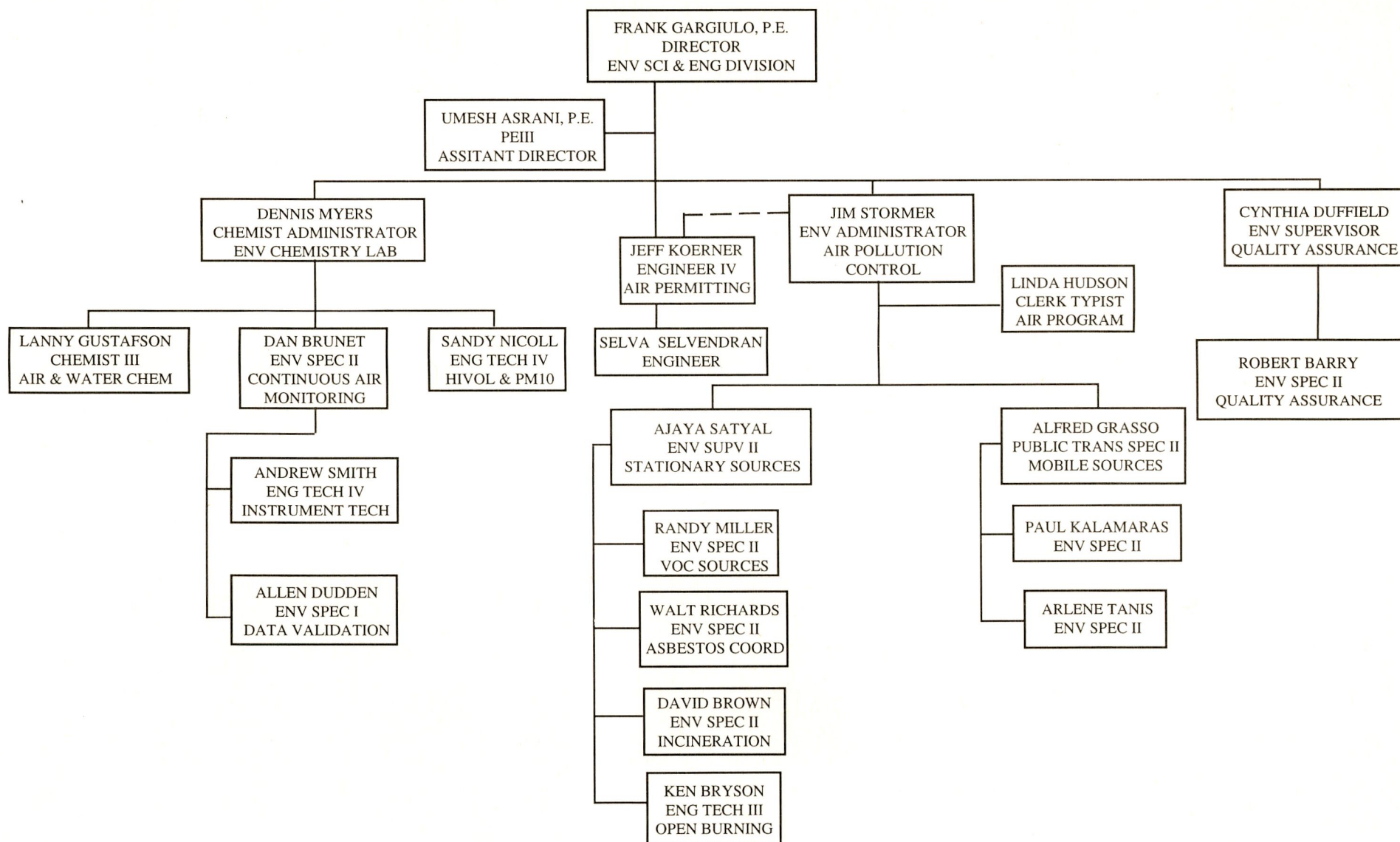


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# ENVIRONMENTAL SCIENCE & ENGINEERING / AIR POLLUTION CONTROL

•Palm Beach County Public Health Unit•









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